METHOD AND SYSTEM FOR SENDING PERSONALIZED OUTGOING VOICEMAIL/MULTIMEDIA MAIL MESSAGES BASED ON THE CALLER ID

FIELD OF THE INVENTION

[0001] The present invention relates to the art of telecommunications in general, and, more particularly, to a method and system for sending personalized outgoing voicemail and multimedia mail messages based on the caller ID in a multimedia telecommunications network.

BACKGROUND OF THE INVENTION

[0002] Wireless telecommunication networks generally allow mobile devices to communicate with each other and other networks, such as the Internet and the public switched telephone network. First and second generation wireless telephone systems are generally constrained in the amount of bandwidth available for communication. This limits capacity and also the types of services that can be provided. Third generation wireless systems, which are being developed through the 3rd Generation Partnership Project (3GPP), hold the promise of greater bandwidth, thereby increasing capacity and allowing for enhanced services, such as multimedia services. 3GPP is the new worldwide standard for the creation, delivery, and playback of multimedia over new, high-speed wireless networks. 3GPP enables the free sharing of multimedia files between a variety of devices, including wireless phones, PDAs (Personal Digital Assistants), and desktop computers. 3GPP devices include, in addition to a voice communication interface, capability for communication of data and display of data, including video.

[0003] Various features and services have been developed and made available to wireless customers. For example, voicemail systems, which are well known, allow callers the option to leave voicemail messages for parties who are unavailable. In order to leave a

message, the caller is typically prompted to enter a command on a keypad of a handset or wait for a specified tone, or both. The voicemail system then records the voicemail message for a predetermined amount of time or until the caller ends the call. Multimedia mail is the exchange of messages consisting of at least two media within a message using the mail transport service. Proposed third generation (3G) wireless systems will permit wireless users the capability to leave multimedia messages in multimedia mail systems similar to that of voicemail systems.

[0003] Wireless service providers also offer caller identification (ID) services, which are well known, for their customers. Caller ID is the identification of the originating subscriber line. The transmission of the caller ID generally takes place between the first and second ring. The information sent includes the date, time, and calling number. The name associated with the calling number is sometimes included also. Since the time caller ID was first made available it has been expanded to offer caller ID on call waiting as well. With caller ID on call waiting, the call waiting tone is heard and the identification of the second call may be displayed on the called party's device.

[0004] Wireless customers are also able to activate voice greetings (and soon multimedia greetings) that are played when the subscriber is not available to answer the call. Nonetheless, wireless customers are not able to personalize for different callers their outgoing voice and/or multimedia messages through their voicemail/multimedia mail system. Thus, a need exists for a method and system for allowing a subscriber to personalize outgoing voicemail and/or multimedia mail messages for different calling parties based upon their caller ID in a multimedia telecommunications network.

SUMMARY OF THE INVENTION

[0005] In accordance with one aspect of the present invention, a method of sending personalized outgoing voicemail/multimedia mail messages based on the caller ID in a multimedia telecommunications network is provided. The method includes storing the subscriber's personalized outgoing voicemail and multimedia mail messages at a first network element, receiving a call having a unique caller ID for the subscriber at a second network element, and determining at the second network element whether the subscriber has activated the service and whether the subscriber is unavailable to take the call. Where the service has been activated by the subscriber and the subscriber is unavailable to take the call, the call is forwarded to the first network element. At the first network element, the caller ID of the call is analyzed to determine which of the stored outgoing messages is an appropriate outgoing message for the caller. Finally, the appropriate outgoing message is played to the caller.

[0006] In accordance with another aspect of the present invention, a system for sending personalized outgoing voicemail/multimedia mail messages based on the caller ID is provided. The system includes a first system element for storing the subscriber's personalized outgoing voicemail and multimedia mail messages, a second system element for receiving a call having a unique caller ID for the subscriber, means for determining at the second network element whether the subscriber has activated the service and whether the subscriber is unavailable to take the call, where the service has been activated by the subscriber and the subscriber is unavailable to take the call, means for forwarding the call to the first network element, means for analyzing at the first network element the caller ID of the call to determine which of the stored outgoing messages is an appropriate outgoing message for the caller; and means for playing the appropriate outgoing message to the caller.

[0007] An object of the present invention is to provide a wireless service whereby subscribers may record personalized outgoing voicemail/multimedia mail messages to be played to different calling parties based on the caller ID.

[0008] Still further advantages and benefits of the present invention will become apparent to those of ordinary skill in the art upon reading and understanding the present specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention may take form in various components and arrangements of components, and in various steps and arrangements of steps. The drawings are only for purposes of illustrating preferred embodiments and are not to be construed as limiting the invention.

[0010] FIG. **1** is a block diagram showing a known multimedia telecommunications environment suitable for practicing aspects of the present invention.

[0011] FIG. **2** is a flow chart illustrating a method of sending personalized outgoing voicemail/multimedia mail messages in accordance with an aspect of the present invention.

[0012] FIG. **3** is memory layout of data stored in the centralized database in accordance with an aspect of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0013] It is to be understood that the specific methods and systems illustrated in the attached drawings and described in the following specification are simply exemplary embodiments of the inventive concepts defined in the appended claims. Therefore, specific examples and characteristics related to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0014] For simplicity and ease of reference, the acronyms listed below shall be used in the specification to refer to structural and/or functional network elements, relevant telecommunications standards, protocols and/or services, terminology, etc., as they are commonly known in the telecommunications art, except to the extent they have been modified in accordance with aspects of the present invention.

[0015] 3G – 3rd Generation

[0016] 3GPP – 3rd Generation Partnership Project

[0017] 3GPP2 – 3rd Generation Partnership Project 2

[0018] AAA – Authentication/Authorization/Accounting

[0019] AH – Address Handling

[0020] AS – Application Server

[0021] BGCF – Border Gateway Control Function

[0022] CCF – Call Control Function

[0023] CDMA – Code Division Multiple Access

[0024] CSCF – Call Session Control Function

[0025] HLR – Home Location Register

[0026] HSS – Home Subscriber Server

[0027] ICGW – Incoming Call Gateway

[0028] IMS – IP Multimedia Subsystem

[0029] IP – Internet Protocol

[0030] MGCF – Media Gateway Control Function

[0031] MGW – Media Gateway

[0032] MMT – Multimedia Terminal

[0033] MRFC – Multimedia Resource Function Controller

[0034] MRFP – Multimedia Resource Function Processor

[0035] PDN – Public Data Network

[0036] PLMN – Public Land Mobile Network

[0037] PSDN – Packet Switched Data Network

[0038] PSTN – Public Switched Telephone Network

[0039] PTT – Push-to-Talk

[0040] RAN – Radio Access Network

[0041] SIP – Session Initiation Protocol

[0042] SMS – Short Message Service

[0043] SMT – Single Media Terminal

[0044] SPD – Serving Profile Database

[0045] UMTS – Universal Mobile Telecommunications System

[0046] VoIP – Voice over IP

[0047] WLAN – Wireless Local Area Network

[0048] FIG. **1** is a block diagram of a typical multimedia telecommunications network **10** in which the present invention may be implemented. The multimedia telecommunications network **10** provides users with a variety of options for communication and is generally known in the art. The network **10** provides access to data networks, such as the Internet, and public telephone networks, including wireless networks. With this network, users are able to transmit and receive multimedia communications, including audio, voice, video, and all types of data.

[0049] The multimedia telecommunications network **10** preferably includes an IP multimedia subsystem (IMS) **20**, which is well known in the art. The IMS **20** relates to a technology standardized by the 3rd Generation Partnership Project, also known as 3GPP, and is used to join mobile communication with IP technologies by adding the ability to deliver

integrated voice and data services over the IP-based packet switched network. IMS services are based on the Session Initiation Protocol (SIP), which is the signaling protocol standard for next-generation 3GPP mobile wireless networks. The IMS **20** typically includes a number of system elements, such as a call session control function (CSCF) **22**, media gateways (MGW) **24**, a media gateway control function (MGCF) **26**, a border gateway control function (BGCF) **28**, a multimedia resource function processor (MRFP) **30**, a multimedia resource function controller (MRFC) **32**, a home subscriber system (HSS) **34**, application servers (AS) **36**, and a voicemail/multimedia mail server (VMS/MMS) **38**. As is known in the art, the IMS **20** manages call sessions and provides and administers packet switching for multimedia communications within the network **10**.

[0050] A first communication device **40** is shown in FIG. **1**. The first communication device **40** may be a wireless device that includes a user interface and an interface for coupling to a radio access network (RAN) **42**. The user interface of the communication device **40** is typically referred to as terminal equipment and generally includes an audio interface, such as a microphone and speakers, a visual interface, such as a display, and a user input interface, such as a keyboard or touch pad. The interface for coupling to the RAN **42** is typically referred to as a mobile terminal and generally includes an over-the-air interface for transmitting and receiving data. The over-the-air interface of the communication device **40** is used to communicate with base stations in the RAN **42**. Preferably, the communication device **40** and the base stations in the RAN **42** communicate over-the-air using a packet-based protocol. A packet data subsystem (PDS) **44** couples the RAN **42** with the IMS **20** and the public data network (PDN) **52** in the usual manner.

[0051] A second communication device **50** is shown as a laptop or notebook computer operatively connected to the IMS **20** via the PDN **52**. The communication device **50** optionally employs a wireless local area network (WLAN) or wire line, in the usual

manner, to operatively connect to the PDN **52**. A third communication device **60** is shown as an ordinary telephone equipped to handle only voice communications. The communication device **60** is operatively connected to the IMS **20** via the public switched telephone network/public land mobile network (PSTN/PLMN) **62**.

[0052] Only three communication devices (**40, 50,** and **60)** are shown in FIG. **1** for the purpose of simplifying the diagram. However, it is to be appreciated that any number of such terminals are typically situated in the multimedia telecommunications network **10**. Additionally, while each is depicted as a specific type of communication device, other like terminals may also be incorporated.

[0053] With continuing reference to FIG. **1**, the bearer paths that carry (or relay) the communication traffic and/or user information for transmission from one terminal to another, which are known in the art, are shown as solid lines. Control paths carry associated signaling and/or control commands (or messages) to and between appropriate network elements for the purpose of managing and routing call sessions. The control paths are shown as dashed lines in FIG. **1**. Suitably, SIP and other known protocols are used on the control and bearer paths, respectively. For example, the known H.248 protocol is suitably employed for media gateway control. The CSCF **22**, the BGCF **28**, the MGCF **26**, the MRFC **32** and the AS **36** comprise the call control and signaling functionality for the IMS **20**, while the bearer paths interface with the MRFP **30** and the MGW **24** to provide and support interconnectivity to external networks and/or subsystems, such as the PDS **44**, the PDN **52** and the PSTN/PLMN **62**.

[0054] The CSCF **22** supports and controls multimedia sessions. The CSCF **22** invites elements such as the MGCF **26** and the MRFC **32** to call sessions to control the establishment and maintenance of bearer paths for call sessions by adding, modifying or deleting appropriate bearer paths for respective call sessions. The CSCF **22** is the signaling

entity for call session control. It manages sessions by using SIP and/or other appropriate call/session establishment protocols, and it provides features and services and coordinates with other network elements for session control, service control and resource allocation.

[0055] The CSCF **22** may provide the following functionalities: incoming call gateway, call control function, serving profile database, and address handling. By functioning as an incoming call gateway the CSCF **22** acts as a call session entry point and routes incoming calls. The call control function generally refers to call setup/termination and state/event management. The CSCF **22** interacts with the MGCF **26** for calls to/from the PSTN/PLMN **62** and with the BGCF **28** for calls to the PSTN/PLMN **62** to determine the appropriate MGCF **26** to use. It also controls the MRFP **30** via the MRFC **32**, which interprets information or signals coming from the CSCF **22** and controls the MFRP **30**, in order to support conferencing and other multi-party services. SIP level registrations from subscribers are processed with the call control function. The call control function may also provide service trigger mechanisms to the application servers **24** to invoke services provided thereby, either locally, at the application servers **24**, or elsewhere. It also reports call events for billing, auditing, intercept or other purposes, and may query the address handling function to check whether a requested communication is allowed given the current subscription. The serving profiling database function refers to the interaction of the CSCF **22** with the HSS **34** to receive and cache user profile information. The address handling function refers to address analysis, translation, modification (when appropriate) and mapping.

[0056] The MGW **24** acts as a bearer path interface between the IMS **20** and external networks and/or subsystems, and provides translation resources and resources for modifying the bearer stream (*e.g.*, encoding, transcoding, compression, packetization, depacketization, etc.). The bearer path elements include the MGCF **26**, the MRFC **32**, and the BGCF **28**. These elements provide the flexibility to add, modify or delete bearers used by the users'

services. More particularly, the MGW **24** interacts with the MGCF **26**, which interprets signaling coming from the CSCF **22** and controls the MGW **24** to achieve resource allocation, bearer path control, and payload processing. The MGCF **26** communicates with the CSCF **22** in order to control the call state for media channels on one or more MGWs and performs conversions between Legacy and 3G Universal Mobile Telecommunications System (UMTS)/Code Division Multiple Access (CDMA) network call control protocols. Similarly, the MRFC **32** controls the media stream resources in the MRFP **30,** which also acts as a bearer path interface between the IMS **20** and external networks and/or subsystems, while being able to provide for conferencing or multiple party communications or other more advanced media services (relative to the MGW **24**). The BGCF **28** selects the proper MGCF **26**.

[0057] The HSS **34** is coupled to the CSCF **22** via a data link. The HSS **34** includes subscriber profile information, including information traditionally associated with a home location register (HLR) for a mobile subscriber. Suitably, the HSS **34** stores information such as user identification, user security information, including network access control information for authentication and authorization, user location information for user registration and locating, and user profiles, including identification of the services subscribed to and other service specific information.

[0058] The application servers **36** are preferably coupled to the IMS **20** for use in interaction with the communication devices **40, 50, 60**. In particular, the CSCF **22** is coupled to the application servers **36** via a data link. Also, the HSS **34** is preferably coupled to the application servers **36**. A myriad of services and applications may reside in or be coupled to the application servers **36**, including a communication session type and quality selection method and system in accordance with the present invention.

[0059] The VMS/MMS **38** is preferably coupled to the IMS **20** for use in interaction with the communication devices **40, 50, 60** and to the CSCF **22** via a data link. Also, the VMS/MMS **38** is preferably coupled to the HSS **34**. There are additional data links from the VMS/MMS **38** to the MGW **24** and to the MRFP **30**. The VMS/MMS **38** provides voicemail and multimedia mail services for subscribers.

[0060] In the preferred embodiment, the CSCF **22**, the MGCF **26**, the MGW **24**, the HSS **34**, the application servers **36**, and the VMS/MMS **38** are all processor-based devices with data link interfaces for coupling together as described above and shown in FIG. 1. These devices include one or more processors that execute programs to implement the functionality described herein and generally associated with 3GPP/3GPP2 wireless systems. The flexibility of these processor-based systems permits ready integration into these systems of a personalized outgoing voicemail/multimedia mail message method and system in accordance with the present invention.

FIG. **2** shows a preferred method **100** for sending personalized outgoing voicemail/multimedia mail messages based on the caller ID. FIG. **2** is described below with reference to the multimedia telecommunications network **10** of FIG. **1**. Let us assume that a wireless subscriber wants to play a special outgoing voicemail or multimedia mail message when receiving a call from a certain caller or group of callers. Thus, initially, in step **101**, the subscriber would record any number of personalized outgoing voicemail and/or multimedia mail messages for specific callers based upon their caller IDs (see Table 1 below).

TABLE 1

CALLER ID	MESSAGE
Phone Numbers 1-10	Message A (voice)
Phone Number 11	Message B (video)
Phone Numbers 12-20	Message C (voice)
All Other Phone Numbers	Message D (default voice message)

[0061] The actual recording of the voice and/or multimedia messages can be made by any known method such as through the first communication device **40** or by logging on to the service provider's Internet Web site and updating their information via the Web through a suitable communication device. The message can be a standard voice message, a video message, or even a text message, depending upon the capabilities of the communication device being used (*e.g.*, mobile phone, PDA, or notebook computer). The personalized outgoing messages corresponding to the specified caller IDs are preferably stored in a centralized database such as the VMS/MMS **38** (step **102**). Each message would preferably include a field for the associated caller ID(s) as well as a field indicating the status of the feature (*e.g.*, active/inactive), although other fields may be associated with the message. Also, depending upon the type of message and equipment involved, text-to-speech or speech-to-text conversion may be necessary.

[0062] The centralized database, such as the VMS/MMS **38**, may include a number of data sub-blocks for each subscriber, as illustrated in FIG. **3**. They are shown as a super block **200**, not all of whose fields are filled for a particular subscriber. The super block, as known in the art, can be accessed from the identity of any one of several fields in the super block. The super block **200** may include the following data sub-blocks: a block **202** containing Message A; a block **204** containing Message B; a block **206** containing Message C; and a

block **208** containing Message D. Of course, any number of additional blocks **210** may be provided in the super block **200** for storing other subscriber data.

[0063] The subscriber then activates the personalized outgoing voicemail/multimedia mail message feature (step **103**). The activation of this feature can be made through any known method, such as by entering a feature activation code (*e.g.*, *78) on a mobile telephone or via the service provider's Web site.

[0064] Next, a call for the subscriber is received at the CSCF **22** in the usual manner (step **104**). That is, calls from personal computers, as represented by the communication device **50**, are routed through the PDN **52** to the CSCF **22**. On the other hand, calls from PSTN users, as represented by the communication device **60**, are routed through the appropriate MGCF **26** (signaling) to the CSCF **22** and the appropriate MGW **24** for the bearer path. Calls from a mobile are routed through the appropriate Radio Access Network **42** to the CSCF **22**. In step **105**, if the CSCF **22** notices that the subscriber has activated the personalized outgoing voicemail/multimedia mail message feature and if the subscriber is unable to take the call either because he or she is out of the service area, has turned off its device, is busy and wishes not to answer the incoming call, etc.., then the call is sent to the VMS/MMS **38**. The CSCF **22** then forwards the call, including the caller ID information, to the VMS/MMS **38** for further processing (step **106**). The VMS/MMS **38** analyzes the caller ID for the call and compares it to the subscriber's stored instructions (step **107**). This analysis can be made through a computer program implemented in the VMS/MMS **38.** The VMS/MMS **38** then locates the appropriate voicemail/multimedia message for that caller ID, or, if no match is found, a default VMS/MMS message is played (step **108**).

[0065] Thus, the invention allows wireless customers to record personalized voice greetings and/or multimedia greetings via that can be played for specific callers when the subscriber is not available to answer the call.

[0066] The invention has been described with reference to the preferred embodiments. Obviously, modifications and alterations will occur to others upon reading and understanding the preceding detailed description of the preferred embodiments. It is intended that the invention be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalence thereof.